

Plant Site Emissions Limit Summary

	<u>PM_{2.5}</u>	<u>PM/PM₁₀</u>	<u>SO₂</u>	<u>NO_x</u>	<u>CO</u>	<u>VOC</u>	<u>GHG</u>	
EU4 "A" Furnace	--	1.8E+01	6.1E+01	1.8E+02	5.8E+00	5.8E+00	35141	tons/yr
EU4 "B" Furnace	--	7.3E+00	2.4E+01	7.2E+01	2.3E+00	2.3E+00	--	tons/yr
EU4 "C" Furnace	--B28	1.1E+01	3.5E+01	8.6E+01	3.3E+00	3.3E+00	--	tons/yr
EU4 "D" Furnace	--	4.9E+00	4.1E+00	0.0E+00	0.0E+00	0.0E+00	29297	tons/yr
EU1& EU3 (Batch Baghouse)	--	8.5E-02	--	--	--	--	--	tons/yr
EU2: Inhouse Cullet Process	--	2.1E+00	--	--	--	--	--	tons/yr
Cullet Processor	--	3.4E+00	--	--	--	--	--	tons/yr
EU5 - Forming Ventilator	--	1.8E+01	2.1E+01	--	--	--	--	tons/yr
Mold Swab Operation	--	2.7E+01	--	--	--	--	--	tons/yr
EU6 - Misc. Fuel burning	--	1.3E-01	1.3E-01	5.2E+00	1.1E+00	3.0E-01	30551	tons/yr
EU7 (Boiler) Nat. Gas	--	6.0E-03	6.2E-03	3.4E-01	8.4E-02	1.4E-02	5533	tons/yr
EU10 - Machine Repair	--	8.8E-01	--	--	--	--	--	tons/yr
EU10 - Mold Bench	--	8.8E-01	--	--	--	--	--	tons/yr
1978 Baseline Emissions	--	95	145	343	13	12	--	tons/yr
Netting Basis	91	95	145	343	13	12	46852	*tons/yr
Plant Site Emissions Limit	100	109	184	382	99	39	100521	tons/yr
Increase	9	14	39	39	86	27	53669	tons/yr
SER	10	15	40	40	100	40	75000	tons/yr

* **GHG PSEL** is being added to the permit for the first time. The calendar year 2010 was selected as the baseline period for GHG emissions.

PM_{2.5} PSEL is being added to the permit for the first time.

1978 Baseline PM & PM₁₀ Emissions

<u>Emissions Unit</u>	<u>1978 Baseline Production</u>	<u>Emission Factor</u>	<u>Ref.</u>	<u>PM/PM₁₀ Emissions</u>
EU1& EU3 (Batch Baghouse)	94098 tons sand+	1.8E-03 lbs/ton	AP42	0.08 tons/yr
EU2: Inhouse Cullet Process	23276 tons cullet	1.8E-01 lbs/ton	AP42	2.09 tons/yr
Cullet Processor	37800 tons cullet	1.8E-01 lbs/ton	AP42	3.40 tons/yr
EU4: Furnace-A, <u>pre-renovation</u>	57630 tons glass	6.30E-01 lbs/ton	ST Avg. ^{-A-}	18.15 tons/yr
Furnace-B	23284 tons glass	6.30E-01 lbs/ton	ST Avg. ^{-A-}	7.33 tons/yr
Furnace-C	33161 tons glass	6.8E-01 lbs/ton	1984 ST	11.27 tons/yr
Furnace-D, <u>electric</u>	41096 tons glass	2.4E-01 lbs/ton	1983 ST	4.93 tons/yr
EU5 - Forming Ventilator ^{-B-}	340 days/yr	4.5E+00 lb/hr	OB	18.36 tons/yr
Mold Swab Operation ^{-C-}	54320 lbs swab mat.	1.0E+00 lb/lb	OB	27.16 tons/yr
EU6 - Misc. Fuel burning	103 10 ⁶ ft ³ NG	2.5E+00 lb/10 ⁶ ft ³	AP42	0.13 tons/yr
EU7 (Boiler) Nat. Gas	4.8 10 ⁶ ft ³ NG	2.5E+00 lb/10 ⁶ ft ³	AP42	0.01 tons/yr
EU10 - Machine Repair	365 days/yr	2.0E-01 lb/hr	OB/Mfg.	0.88 tons/yr
EU10 - Mold Bench	365 days/yr	2.0E-01 lb/hr	OB/Mfg.	0.88 tons/yr
				94.7 PM₁₀**

EU9 Corrugated board shredder^{##}

Note: Raw materials (e.g., sand, soda ash, etc.) usage in 1978 obtained from OB's annual report dated 03/21/1979.

1978 glass production data submitted by OB on 02/23/2010: Furnaces A, B & C mostly produced "Flint" glass, and Furnace-D produced ~90% Amber & ~10% green.

ALL other process throughputs (e.g., cullet, swabbing lubricant/material, NG usage) and operating schedule came from OB's original Title-5 application.

^{-A-} Average of all PM source tests performed on Furnaces A & D from 1983 to 2007; see page A12. [Note: AP42 PM EF of 1.3 lbs/ton is too high for "modified-process."]

See 40 CFR 60.291 (subpart CC) for definition of "modified-process." O-B is subject to PM limit of 1 lb/ton applicable to modified process.

^{-B-} Emissions in 1978 from "Forming Ventilator" before "HEST-A" baghouse was installed in 1982 to abate SnCl₄ used in bottle surface treatment process. Currently the surface treatment process applies mono-butyl-tin trichloride (MBTT) in lieu of SnCl₄ then injects NH₃ to combine excess Sn to form solid PM that baghouse can collect.

^{-C-} Mold Swab operations manually apply oil-graphite mixture onto heated molds.

** All PM/PM₁₀ emissions from baseline are considered PM₁₀. The PM-only emissions from EU9 are excluded from the baseline PM₁₀ calculations.

^{##} EU9 corrugated board shredder that Owens operated in 1978 has been dismantled and removed from the site.

The EU9 shredder operated about 2500 hours in 1978. Estimated hourly rate from EU9 was 2.5 lbs PM/hr.

1978 Baseline SO₂ & NO_x Emissions

<u>Emissions Unit</u>	<u>Baseline Production</u>	<u>Emission Factor</u>	<u>Ref.</u>	<u>SO₂ Emissions</u>
EU4: Furnace-A, <u>pre-renovation</u>	57630 tons Flint	2.1E+00 lbs/ton	ST Avg. ^{-D-}	6.05E+01 tons/yr
Furnace-B	23284 tons Flint	2.1E+00 lbs/ton	ST Avg. ^{-D-}	2.44E+01 tons/yr
Furnace-C	30115 tons Flint	2.1E+00 lbs/ton	ST Avg. ^{-D-}	3.48E+01 tons/yr
	3046 tons Amber			
Furnace-D, <u>electric</u>	41096 tons Amber and Green	2.0E-01 lbs/ton	1983 ST	4.11E+00 tons/yr
EU5 - Forming Ventilator ^{-D-}	41400 lbs SO ₂	1.0E+00 lb/lb	OB	2.07E+01 tons/yr
EU6 - Misc. Fuel burning	103 10 ⁶ ft ³ NG	2.6E+00 lb/10 ⁶ ft ³	AP42	1.34E-01 tons/yr
EU7 (Boiler) Nat. Gas	4.8 10 ⁶ ft ³ NG	2.6E+00 lb/10 ⁶ ft ³	DEQ	6.24E-03 tons/yr
				145 tons/yr

<u>Emissions Unit</u>	<u>Baseline Production</u>	<u>Emission Factor</u>	<u>Ref.</u>	<u>NO_x Emissions</u>
**EU4: Furnace-A, <u>pre-renovation</u>	57630 tons glass	6.2E+00 lbs/ton	AP42	1.79E+02 tons/yr
Furnace-B	23284 tons glass	6.2E+00 lbs/ton	AP42	7.22E+01 tons/yr
Furnace-C	33161 tons glass	5.2E+00 lbs/ton	1984 ST	8.62E+01 tons/yr
Furnace-D, <u>electric</u>	41096 tons glass	-ND- lbs/ton	1983 ST	0.00E+00 tons/yr
EU6 - Misc. Fuel burning	103 10 ⁶ ft ³ NG	1.0E+02 lb/10 ⁶ ft ³	AP42	5.15E+00 tons/yr
EU7 (Boiler) Nat. Gas	4.8 10 ⁶ ft ³ NG	1.4E+02 lb/10 ⁶ ft ³	AP42	3.36E-01 tons/yr
				343 tons/yr

^{-B-} Sulfur dioxide emissions in 1978 from "Forming Ventilator" before "HEST-A" baghouse was installed.

Owens Brockway used to manufacture small quantity of glass containers used in medical field that received the SO₂ gas treatment process.

^{-D-} Average of all SO₂ source tests performed on Furnaces A & D from 1983 to 2007; see page A12. [Note: AP42 SO₂ EF of 3.4 lbs/ton is too high.]

** Furnace-A modification completed on 4/07/1983 - enlarged the regenerative system/melt area from 566 to 786 ft² and increased the number of firing ports from 8 to 10;

Furnace-B shutdown permanently in Dec.1978; Furnace-C shutdown permanently on April 2, 1990; and Electric Furnace-D converted to NG fired furnace in 1986.

No NO_x source test data exist for furnaces A & B before their conversion/shutdown.

1978 Baseline CO & VOC Emissions

<u>Emissions Unit</u>	<u>Baseline Production</u>	<u>Emission Factor</u>	<u>Ref.</u>	<u>CO Emissions</u>
EU4: Furnace-A, <u>pre-renovation</u>	57630 tons glass	2.0E-01 lbs/ton	AP42	5.76E+00 tons/yr
Furnace-B	23284 tons glass	2.0E-01 lbs/ton	AP42	2.33E+00 tons/yr
Furnace-C	33161 tons glass	2.0E-01 lbs/ton	AP42	3.32E+00 tons/yr
Furnace-D, <u>electric</u>	41096 tons glass	-- lb/10 ⁶ ft ³	--	0.00E+00 tons/yr
EU6 - Misc. Fuel burning	103 10 ⁶ ft ³ NG	2.1E+01 lb/10 ⁶ ft ³	AP42	1.08E+00 tons/yr
EU7 (Boiler) Nat. Gas	4.8 10 ⁶ ft ³ NG	3.5E+01 lb/10 ⁶ ft ³	AP42	8.40E-02 tons/yr
Fuel Oil	0 10 ³ gal oil	5.0E+00 lb/10 ³ gal	AP42	<u>0.00E+00</u> tons/yr
				13 tons/yr

<u>Emissions Unit</u>	<u>Baseline Production</u>	<u>Emission Factor</u>	<u>Ref.</u>	<u>VOC Emissions</u>
EU4: Furnace-A, <u>pre-renovation</u>	57630 tons glass	2.0E-01 lbs/ton	AP42	5.76E+00 tons/yr
Furnace-B	23284 tons glass	2.0E-01 lbs/ton	AP42	2.33E+00 tons/yr
Furnace-C	33161 tons glass	2.0E-01 lbs/ton	AP42	3.32E+00 tons/yr
Furnace-D, <u>electric</u>	41096 tons glass	-- lb/10 ⁶ ft ³	--	0.00E+00 tons/yr
EU6 - Misc. Fuel burning	103 10 ⁶ ft ³ NG	5.8E+00 lb/10 ⁶ ft ³	AP42	2.99E-01 tons/yr
EU7 (Boiler) Nat. Gas	4.8 10 ⁶ ft ³ NG	5.8E+00 lb/10 ⁶ ft ³	AP42	1.39E-02 tons/yr
Fuel Oil	0 10 ³ gal oil	5.6E-01 lb/10 ³ gal	AP42	<u>0.00E+00</u> tons/yr
				12 tons/yr

Current PM₁₀ Emissions

<u>Emissions Unit</u>	<u>SCC</u>	<u>Annual Production</u>	<u>Emission Factor</u>	<u>Ref.</u>	<u>PM₁₀ Emissions</u>
EU1& EU3 (Batch Baghouse) Blending & mixing process	30510405/499 30510199/299	94098 tons mat.	1.8E-03 lbs/ton	AP42	0.08 tons/yr
EU2 - Inhouse Cullet Process Cullet Processor	30501413	23276 tons cullet 37800 tons cullet	1.8E-01 lbs/ton 1.8E-01 lbs/ton	AP42 AP42	2.09 tons/yr 3.40 tons/yr
EU4: Furnace-A Furnace-D	30501401 30501401	86458 tons glass 66562 tons glass	7.0E-01 lbs/ton 6.0E-01 lbs/ton	ST Avg. ^{-F-} ST Avg. ^{-G-}	30.26 tons/yr 19.97 tons/yr
EU5 - HEST-A Baghouse Mold Swab Operations	30501406	35 tons MBTT 54320 lbs swab	2.2E+01 lbs/ton 1.0E+00 lb/lb	OB OB	0.39 tons/yr 27.16 tons/yr
EU6 - Misc. Fuel burning	30590003	100 10 ⁶ ft ³ NG ^{-MAX-}	2.5E+00 lb/10 ⁶ ft ³	AP42	0.13 tons/yr
EU7 (Boiler) Nat. Gas	10100602	50 10 ⁶ ft ³ NG ^{-MAX-}	2.5E+00 lb/10 ⁶ ft ³	AP42	0.06 tons/yr
EU10 - Machine Repair		4380 hrs/yr	2.0E-01 lb/hr	OB/Mfg.	0.44 tons/yr
EU10 - Mold Bench		4380 hrs/yr	2.0E-01 lb/hr	OB/Mfg.	0.44 tons/yr
					84 tons/yr

^{-F-} Average of all PM source tests performed on Furnace A from 1983 to 2007; see page A12.

^{-G-} Average of all PM source tests performed on Furnace D from 1993 to 2007; see page A12.

^{-MAX-} Annual (maximum) production data provided in the March 15, 1995 Title V permit application.

Current PM_{2.5} Emissions

<u>Emissions Unit</u>	<u>PM₁₀ PSEL effective 2011</u>	<u>PM_{2.5} % in PM₁₀</u>	<u>Ref.</u>	<u>PM_{2.5} PSEL</u>	
EU1& EU3 (Batch Baghouse)	0.08	100%	estimate ⁻¹⁻	0.08	tons/yr
EU2: Cullet Processing	5.50	6%	estimate ⁻²⁻	0.33	tons/yr
EU4: Furnaces A & D	50.23	96%	AP42	48.22	tons/yr
EU5: Mold Swabbing (i.e., lubricant)	27.16	100%	estimate ⁻³⁻	27.16	tons/yr
HEST-A Baghouse	0.39	100%	estimate ⁻¹⁻	0.39	
EU6 - Misc. Fuel burning	0.13	100%	AP42	0.13	tons/yr
EU7 (Boiler) Nat. Gas	0.06	100%	AP42	0.06	tons/yr
EU10 - Machine Repair	0.44	100%	estimate ⁻¹⁻	0.44	tons/yr
EU10 - Mold Bench	<u>0.44</u>	100%	estimate ⁻¹⁻	<u>0.44</u>	tons/yr
	84.42	tons/yr		77.24	
PM _{2.5} /PM ₁₀ Ratio:				0.92	
PM ₁₀ Netting Basis:				95	tons/yr
PM _{2.5} Netting Basis:				91	tons/yr

⁻¹⁻ All baghouse controlled PM/PM₁₀ emissions are considered PM_{2.5}

⁻²⁻ AP42's PM_{2.5} fraction (Table 11.19.2-2) for crushed stone is used for cullet crushing/processing.

⁻³⁻ Particle size distribution data published by www.engineeringtoolbox.com used for oil (i.e., swab lubricants) smoke; 0.3 - 1 micron.

⁻⁴⁻ Pursuant to OAR 340-222-0046(2)(b), the initial PM_{2.5} netting basis was adjusted up by 4 tons (<5tons).

Current SO₂ & NO_x Emissions

<u>Emissions Unit</u>		<u>Annual Production</u>	<u>Emission Factor</u>	<u>Ref.</u>	<u>SO₂ Emissions</u>
EU4: Furnace-A		86458 tons glass	2.1E+00 lbs/ton	ST Avg. ^{-H, I-}	90.78 tons/yr
Furnace-D		66562 tons glass	2.1E+00 lbs/ton	ST Avg. ^{-H, I-}	69.89 tons/yr
EU6 - Misc. Fuel burning	est. NG usage	100 10 ⁶ ft ³ NG	2.6E+00 lb/10 ⁶ ft ³	AP42	0.13 tons/yr
EU7 (Boiler) Nat. Gas	est. NG usage	50 10 ⁶ ft ³ NG	2.6E+00 lb/10 ⁶ ft ³	AP42	0.07 tons/yr
					161 tons/yr

<u>Emissions Unit</u>		<u>Annual Production</u>	<u>Emission Factor</u>	<u>Ref.</u>	<u>NO_x Emissions</u>
EU4: Furnace-A		86458 tons glass	4.7E+00 lbs/ton	ST Avg. ^{-J-}	203.18 tons/yr
Furnace-D		66562 tons glass	3.7E+00 lbs/ton	ST Avg. ^{-K-}	123.14 tons/yr
EU6 - Misc. Fuel burning		100 10 ⁶ ft ³ NG	1.0E+02 lb/10 ⁶ ft ³	AP42	5.00 tons/yr
EU7 (Boiler) Nat. Gas		50 10 ⁶ ft ³ NG	1.4E+02 lb/10 ⁶ ft ³	AP42	3.50 tons/yr
					335 tons/yr

<u>Emissions Unit</u>	<u>Capacity tons/yr</u>	<u>Potential Production</u>	<u>Potential SO₂ Emissions</u>	<u>Potential NO_x Emissions</u>
EU6 & EU7 NG Combustion	--	--	0.2 tons/yr	8.5 tons/yr
EU4: Furnace-A	98550	98550 tons glass	103.5 tons/yr	231.6 tons/yr
Furnace-D	82125 >	76500 tons glass	80.3 tons/yr	141.5 tons/yr
		175050	184 = SO₂ PSEL	382 = NO_x PSEL

^{-H-} Average (not furnace specific) of all SO₂ source tests performed on Furnaces A & D from 1983 to 2007; see page A12.

^{-I-} The SO₂ emissions partly depend on the decomposition of sulfates in the batch material and from the oxidation of sulfur in the fuel used.

The Owens furnaces burn essentially sulfur-free NG, and the chemistry of batch materials remained fairly constant since baseline.

^{-J-} Average of all NO_x source tests performed on Furnace A from 1983 to 2007; see page A11.

^{-K-} *Average of all NOx source tests performed on Furnace D from 1986 to 2007; see page A11.*

Current CO & VOC Emissions

<u>Emissions Unit</u>	<u>Annual Production</u>	<u>Emission Factor</u>	<u>Ref.</u>	<u>CO Emissions</u>
EU4: Furnace-A	86458 tons glass	2.0E-01 lbs/ton	AP42	8.65 tons/yr
Furnace-D	66562 tons glass	2.0E-01 lbs/ton	AP42	6.66 tons/yr
EU6 - Misc. Fuel burning	100 10 ⁶ ft ³ NG	2.1E+01 lb/10 ⁶ ft ³	AP42	1.05 tons/yr
EU7 (Boiler) Nat. Gas	50 10 ⁶ ft ³ NG	3.5E+01 lb/10 ⁶ ft ³	AP42	0.88 tons/yr
Fuel Oil	-- 10 ³ gal oil ^{-N-}	5.0E+00 lb/10 ³ gal	AP42	0.00 tons/yr
				17 tons/yr

<u>Emissions Unit</u>	<u>Annual Production</u>	<u>Emission Factor</u>	<u>Ref.</u>	<u>VOC Emissions</u>
EU4: Furnace-A	86458 tons glass	2.0E-01 lbs/ton	AP42	8.65 tons/yr
Furnace-D	66562 tons glass	2.0E-01 lbs/ton	AP42	6.66 tons/yr
EU5 - Hot end Surface Treat.	35 tons MBTT	9.0E+01 lbs/ton	OB	1.58 tons/yr
EU6 - Misc. Fuel burning	100 10 ⁶ ft ³ NG	5.8E+00 lb/10 ⁶ ft ³	AP42	0.29 tons/yr
EU7 (Boiler) Nat. Gas	50 10 ⁶ ft ³ NG	5.8E+00 lb/10 ⁶ ft ³	AP42	0.15 tons/yr
Fuel Oil	-- 10 ³ gal oil ^{-N-}	5.6E-01 lb/10 ³ gal	AP42	0.00 tons/yr
				17 tons/yr

^{-N-} Although EU7 Boiler is capable of burning fuel oil, its oil usage is limited by the SO₂ PSEL since using high sulfur fuel can result in PSEL excursion.

2010 Baseline Green House Gas (GHG) Emissions

<u>Emissions Unit</u>	<u>Annual Production</u>	<u>EPA's GHG Emission Factor</u>	<u>CO₂e Emissions</u>
<u>EU4 Furnaces A & D</u>			
Limestone Addition:	11766 tons	0.44 ton CO ₂ e/ton	5177 tons/yr
Soda Ash Addition:	12252 tons	0.415 ton CO ₂ e/ton	5085 tons/yr
EU4: Furnace-A	308.28 10 ⁶ ft ³ NG		
Furnace-D	207 10 ⁶ ft ³ NG		
EU6 - Misc. Fuel burning	93 10 ⁹ ft ³ NG	CO ₂ 5.302E+01 Kg/MMBtu	
EU7 (Boiler) Nat. Gas	0 10 ⁹ ft ³ NG	CH ₄ as CO ₂ e 2.100E-02 Kg/MMBtu	
Total NG Usage:	608 10 ⁹ ft ³ NG	N ₂ O as CO ₂ e 3.100E-02 Kg/MMBtu	
NG conversion (1028 Btu/ft ³)	625466 MMBtu NG	Total CO₂e 53.0720 Kg/MMBtu	33194734 Kg/yr
			36591 tons/yr
Total 2010 Baseline GHG emissions:			46852 tons/yr

Limestone usage calculated as 8.49% of total glass pull from the A & D furnaces.

Soda Ash usage calculated as 8.84% of total glass pull from the A & D furnaces.

Requested Green House Gas (GHG) Emissions

<u>Emissions Unit</u>	<u>Annual Production</u>	<u>EPA's GHG Emission Factor</u>	<u>CO₂e Emissions</u>
<u>EU4 Furnaces A & D</u>			
Limestone Addition:	15340 tons	0.44 ton CO ₂ e/ton	6750 tons/yr
Soda Ash Addition:	15973 tons	0.415 ton CO ₂ e/ton	6629 tons/yr
		NG EF	<u>CO₂e Emissions</u>
		MMBtu** Kg/MMBtu	Kg/yr tons/yr
EU4: Furnace-A	463 10 ⁶ ft ³ NG -MAX-	475964 5.3072E+01	2.53E+07 27845
Furnace-D	386 10 ⁶ ft ³ NG -MAX-	396808 5.3072E+01	2.11E+07 23214
EU6 - Misc. Fuel burning	508 10 ⁶ ft ³ NG -MAX-	522224 5.3072E+01	2.77E+07 30551
EU7 (Boiler) Nat. Gas	92 10 ⁶ ft ³ NG -MAX-	94576 5.3072E+01	5.02E+06 5533
Total NG Usage:	1449 10 ⁶ ft ³ NG	7.91E+07	87143 tons/yr
NG conversion** (1028 Btu/ft ³)	1489572 MMBtu NG		
Requested GHG emissions:			100521 tons/yr

GHG Emission Factor for Natural Gas Combustion

CO ₂	5.302E+01	Kg/MMBtu
CH ₄ as CO ₂ e	2.100E-02	Kg/MMBtu
N ₂ O as CO ₂ e	3.100E-02	Kg/MMBtu
Total CO₂e	53.0720	Kg/MMBtu **

** Any one of the over-all EF listed below can also be used to calculate the CO₂e emissions from NG combustion.

5.3072E-02	Metric tons/MMBtu
5.8502E-02	tons/MMBtu
5.3072E-03	Metric tons/Therms
5.8502E-03	tons/Therms

-MAX- Annual (maximum) natural gas usage data provided in the March 15, 1995 Title V permit application.

It is highly unlikely the actual natural gas usage will ever reach the capacity of fuel burning equipment.

Furnace Source Test Results for NO_x

<u>Furnace & Year Tested</u>	<u>NO_x (lb/hr)</u>	<u>lb/ton glass</u>	<u>lb/10³ft³ gas</u>	<u>cullet (%)</u>	<u>boost (kW-hr)</u>	<u>temp (F)</u>	<u>gas (mcf/hr)</u>	<u>boost/gas</u>
Furnace-A, 1983	45.2	5.3	1.51	32	1250	2813	29.9	41.8
Furnace-C, 1984	19.5	5.2	1.16	43	425	2800	16.8	25.3
Furnace-D, 1986	29.5	5.6	1.18	24		2770	25.1	0.0
Furnace-D, 1993	18.9	2.5	0.68	61	820	2810	27.6	29.7
Furnace-A, 1993	44.1	5.3	1.29	40	355	2810	34.1	10.4
Furnace-D, 1998	24.0	3.0	0.95	56	1113	2771	25.2	44.2
Furnace-A, 1998	69.5	7.4	4.43	66	733	2861	15.7	46.7
Furnace-A, 2003	28.1	3.1	0.88	65	592	2848	32.1	18.4
Furnace-D, 2003	28.6	4.4	1.19	75	1249	2840	24.0	52.0
Furnace-A, 2007	21.7	2.2	0.68	47	1048	2780	32.0	32.8
Furnace-D, 2007	20.0	2.9	0.85	46	942	2780	23.5	40.1
Average (All Furnaces)	31.7	4.3	1.3	50	853	2808	26.0	31.0

Furnace-A Average:	4.7
Furnace-D Average:	3.7

Furnace Source Test Results for PM & SO₂

<u>Furnace & Year Tested</u>	<u>lb PM/ton glass</u>	<u>lb SO₂/ton glass</u>	<u>Glass Color</u>	<u>%SO₃ in Batch</u>
Furnace-A, 05/16/1983	0.66	1.5	NA	NA
Furnace-A, 06/15/1993	0.82	1.3	Flint	0.242%
Furnace-A, 09/30/1998	0.76	1.9	Amber	0.240%
Furnace-A, 04/16/2003	--	2.0	Amber	0.301%
Furnace-A, 09/03/2003	0.56	--	--	--
Furnace-A, 11/16/2006	0.58	--	Amber	--
Furnace-A, 11/13/2007		3.1	Amber	0.260%
Furnace-A Average:	0.7	2.0		
Furnace-C, 1984 ST	0.68	0.7**	Amber/Green	--
Furnace-D _{elec} , 1983 ST	0.24	0.2	--	--
Furnace-D, 06/14/1993	0.7	2.1	Amber	0.261%
Furnace-D, 10/01/1998	0.5	1.7	Green	NA
Furnace-D, 04/15/2003	--	2.6	Amber	0.269%
Furnace-D, 09/04/2003	0.4	--	--	--
Furnace-D, 09/18/2006	0.7	--	Amber	--
Furnace-D, 11/12/2007	--	2.4	Amber	0.258%
Furnace-D Average:	0.6	2.2		
Furnaces A & D Average:	0.63	2.1		

** Furnace-C's 1984 SO₂ source test result of 0.74 lbs/ton is out of line with the rest of NG-combustion (forced air) furnaces; especially when compared to AP42 SO₂ EF of 3.4 lbs/ton.